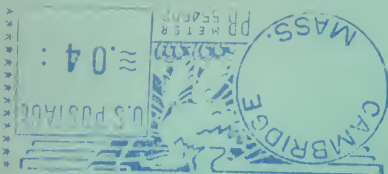


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$$E = L \frac{dI}{dt}$$


Where

E = THE EFFORT YOU EXPEND GETTING THE INFORMATION YOU WANT

L = THE COEFFICIENT OF OBSTRUCTANCE OF THE INFORMATION SOURCE

dI/dt = THE RATE OF INFORMATION FLOW FROM THIS SOURCE

If Lenz will pardon us for this paraphrase of his famous law, may we take a few minutes of your time in order to reduce our L , and your E , to zero? On 10/21/66 information was sent to you about Princeton Applied Research-Digital Voltmeter in response to your recent inquiry or expression of interest. Model CS-3.1

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THIS INFORMATION IS FOR: ☐ REFERENCE; ☐ A PROJECT BECOMING ACTIVE ___/___/___; ☐ AN IMMEDIATE APPLICATION.

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10/21/66

CS-3.1



DIGITAL VOLTMETER MODEL CS-3.1

SOLID STATE / REED RELAY DVM

\$995.00

featuring

- Automatic Ranging
- Automatic Polarity
- 10 Meg Input Impedance
- >100 db Common Mode Rejection
- Truly Floating Differential Input
- Small Size
- 0.1% Absolute Accuracy
- High Reliability
- Rugged Printed Circuit Construction
- No Stepping Switches
- Easily Panel Mounted



MODEL CS-3.1

The PAR Model CS-3.1 represents a significant breakthrough in price, size and operating characteristics of digital voltmeters. At a price equivalent to that required to be paid for tube and stepping switch type digital voltmeters, PAR has made available a highly reliable transistor/reed-relay instrument incorporating many desirable and several unique features for DVM's in this price range. Solid state components are used throughout except at the input stage of the comparator where two miniature triode tubes are used to obtain the required high impedance input. High reliability reed-relays are used to switch the attenuators, as well as to stabilize the amplifiers. Long service-free life is assured by rugged plug-in type printed circuit construction and the use of long-life nixie¹ tubes. This portable automatic instrument now makes possible rapid and accurate digital measurement of DC voltages at a cost almost equivalent to analog indicating meters of equal accuracy.

¹ "Nixie" is a registered trade name of the Burroughs Corporation.

PRINCETON APPLIED RESEARCH CORPORATION
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TELEPHONE 799-1222
AREA CODE 609

TRANSISTORIZED DIGITAL VOLTMETER MODEL CS-3.1

PRINCIPLE OF OPERATION:

The CS-3.1 Digital Voltmeter operates by comparing a sample of unknown DC potential with an internally generated ramp consisting of one millivolt steps, and displaying the accumulated ramp step count on in-line nixie readout tubes. The ramp is generated by means of a solid state charge pump feeding a Miller integrator. The charge pump is driven by an oscillator which also drives a three digit decade counter. The integrator input receives quantized charge in amounts just sufficient to raise the integrator output by one millivolt for each cycle of the oscillator. Thus each state of the counter truly represents the instantaneous ramp level in millivolts, independent of any variations in the oscillator frequency, assuring a high degree of stability.

The automatic ranging circuit programs an attenuator in such a manner as to charge a memory capacitor to a level for which a full three digit reading is obtained for an input greater than one hundred millivolts. The memory capacitor is switched between the attenuator and the comparator, which results in isolation of the attenuator from the rest of the instrument. A guard connection is brought out externally and when connected to the "low" input terminal results in the optimum in common mode rejection.

TECHNICAL SPECIFICATIONS.

RANGE: DC voltages from ± 0.001 to ± 999 volts in ranges of $\pm 999/9.99/99.9/999$ volts full scale. Voltages greater than 100 millivolts are displayed with three significant digits.

ACCURACY: Within $\pm 0.1\%$ of reading ± 1 count.

INPUT IMPEDANCE: 10 Megohms for DC on all ranges except the lowest range where it is a minimum of 1000 Megohms for DC, (1 Meg in series with 0.1 mfd for AC).

FLOATING DIFFERENTIAL INPUT: Truly floating and guarded differential input circuit permits differential voltage measurements with guard floating up to ± 500 volts DC with respect to chassis, which is at power line ground.

COMMON MODE REJECTION: 1) With respect to power ground (guard and "low" input terminal connected together): For balanced or unbalanced (1000 ohm) DC common mode signals up to ± 500 volts, and AC common mode signals up to 60 cps at 100 volts peak-to-peak maximum, the rejection is beyond the sensitivity of the instrument (greater than 100 d.b.).

2) For truly differential inputs: (Guard at the common mode potential with respect to "low" input terminal): Common mode error is plus 1 count or minus 1 count per 7 volts of common mode signal depending on polarity of guard relative to "low" terminal. Common mode potential between guard and "low" terminal must not exceed ± 100 volts.

RANGE SELECTOR: Automatic. A "HOLD" control disables the automatic down-ranging programmer and permits manual selection of range if desired.

POLARITY INDICATOR: Automatic.

BALANCING TIME: 0.15 to 3.15 seconds, depending on the change of range required.

SAMPLE RATE: One reading per second, (0.15 seconds conversion time and 0.85 seconds read-out time), if no

range change. Sample rate may be controlled externally in instruments provided with an output connector for digital print-out.

EXTERNAL CONTROLS: A five position switch provides the following functions: 1) "OFF"; 2) "AUTO" (for fully automatic operation); 3) "ZERO" (for checking zero—set by an externally available control); 4) "HOLD" (for manual range selection—disables the down-ranging programmer); 5) "CALIBRATE" (for checking absolute accuracy—set by an externally available control). The manual selection of range is accomplished by use of the "ZERO", "HOLD" and "CALIBRATE" positions.

OUTPUTS: Available with ten line decimal coded output for digital print-out.

READOUT: Long-life standard size nixie tubes; readable at 30 feet.

INPUT CONNECTIONS: Front and Rear.

DIMENSIONS: 6½ inches wide; 5 inches high; 8¾ inches deep. One or two units can be mounted in 5¼" standard rack panel without requiring modifications or any additional hardware.

CONSTRUCTION: Completely solid state electronic circuitry except for two miniature nuvistor tubes. Long-life dry-reed relays for automatic ranging and polarity logic and amplifier stabilization.

WEIGHT: Net 9 lbs.

POWER: 105 to 125 or 215 to 245 volts AC; 50 to 60 cps; 17 watts.

PRICE: \$995.00. With ten line decimal coded output \$1070.00. Mounted in 5¼" standard rack panel add \$25.00 (Specify Left, Right, Center, or Left and Right mounting). Export Prices approximately 5% higher. (Except Canada)

WARRANTY: 1 year.

Specifications and Prices are subject to change without notice.

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